UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/961,119	09/20/2001	Kent W. Carey	10004333-1	4191

7590 11/14/2005

AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599

EXAMINER	
PAYNE, DAVID C	

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/961,119	CAREY, KENT W.	
	Examiner	Art Unit	
	David C. Payne	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-9,11-14,16-23,25-28 and 30-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-9,11-14,16-23,25-28 and 30-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 29 August 2005 have been fully considered but they are not persuasive. Applicant's arguments regarding "passing a desire portion of the optical signals" have been sufficiently addressed in the office action of 31 May 2005. The Examiner maintains the position as set forth in the aforementioned office action; the applicant is referred to that communication.

2. Furthermore, Roberts is replete with disclosure of frequency modulation as shown below. As such, the applicant's traverse is deemed sufficiently addressed.

e.g., col./line(s): 3/33-40

modulating the spectrum of the pulse with a set of spectral modulations associated with respective channels such that a respective channel value for each channel is represented by an amount of corresponding spectral modulation, wherein each spectral modulation is defined by a respective characteristic of modulation as a function of frequency and wherein the characteristics are mutually orthogonal in frequency space.

e.g., col./line(s): 3/40-45

Such spectral modulation (referred to below as Fourier modulation) may conveniently be in the form of sinusoidal modulations in frequency space which may then be detected by Mach-Zehnder filters at a receiver.

e.g., col./line(s): 9/30-47

A second example of multiplexing in an optical transmission system of the type described above with reference to FIG. 1 will now be described. FIG. 6A illustrates a method of modulating a single optical pulse to carry a large number of channels by a spectral modulation technique which is alternatively referred to herein as Fourier modulation. Unlike the above described wavelength division multiplexing technique, the Fourier modulation technique encodes the optical pulse such that each channel utilises a broad bandwidth of the pulse i.e. a large number of the modes of FIG. 2, Graph B, the same bandwidth being available to each of the channels, and the channels being associated with respective periodic modulations in frequency space of the spectrum of the transmitted pulse. The term modulation in this context implies a characteristic imposed into the envelope of the spectrum of the optical pulse and which is generally

time invariant for the duration of the pulse (as described below with reference to FIG. 7A).

e.g., col./line(s): 9/49-55

A periodic modulation of the spectrum with a specific period in frequency space may for example be achieved using a Mach Zehnder interferometer in which mutually coherent samples of the pulse are recombined after introducing a delay d.sub.i in one component, the resulting modulation in frequency space being a sinusoid having a periodicity expressed as a frequency increment equal to the inverse of the delay.

e.g., col./line(s): 10/27-64

The pulses are introduced to the array via polarization and phase modulators 68 which act to invert the optical phase of each successive pulse and shift the polarization by 90 degrees between successive pulses. These measures reduce the likelihood of coherent addition between successive pulses. The nature of the spectral modulation is explained schematically in FIG. 7 in which a spectral modulation unit 78 in the form of a Mach Zehnder interferometer performs spectral modulation which is detected by an analyser 7 in the form of a Mach-Zehnder filter and where in each case a delay d.sub.i is represented by a respective delay element 67. Division and recombination after introducing a delay into one arm of the interferometer 78 as shown in FIG. 7 results in a modulation of the spectral content of the pulse. This modulation is illustrated schematically in graph A of FIG. 7 which shows a generally sinusoidal modulation in frequency space of the power, peak power being shown at a series of frequencies f.sub.x, f.sub.y, f.sub.z, . . . and minimum power being shown at a series of frequencies f.sub.a, f.sub.b, . . . The periodicity of this modulation in frequency space is determined by the value of d.sub.i (the frequency interval between peaks=(d.sub.i).sup.-1) and frequencies f.sub.x, f.sub.y, f.sub.z, . . . are frequencies for which a phase difference between the outputs of the two arms of the interferometer is an even multiple of .pi., thereby giving constructive interference. Frequencies f.sub.a, f.sub.b, f.sub.c, . . . are frequencies for which a phase difference between the outputs is an odd multiple of .pi., thereby giving destructive interference. Where a series of interferometers with distinct values of d.sub.i are provided as in the case of the waveguide array of FIG. 6A, a set of distinct, orthogonol modulations in frequency space are possible. FIG. 6B shows schematically a representation of the delay waveguides 66 of FIG. 6A using the delay element notation of FIG. 7. The summation of these distinct sinusoidal modulations in frequency space may be regarded as constituting a Fourier series and hence the spectral modulation may be termed Fourier modulation in the present context.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1- 3, 7, 8, 13, 14, 17- 19, 21, 26- 28, 31- 33, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox et al. US 5,526,155 A (Knox).

Re claims 1, 2, 3, 7, 13, 14, 17, 18, 19, 21, 27, 28, 31, 32, 33, 35 Knox disclosed a broadband frequency spectrum source (11 of Figure 2) that is split into a plurality of different carrier wavelengths (20, 22 of Figure 2) after splitting by a diffraction grating (18) the plurality of signals are then modulated by an array of modulators (26 of Figure 2) responsive to data signals (29 of Figure 2) which are then recombined by the diffraction grating (18) which are then output to a desired transmission medium (34 of Figure 2), see col. 7 lines 1-50. Knox does not disclose the literal "passing a plurality of desire portions of the optical signal using a plurality of modulators, ...". However, Know disclosed that a portion of the signal from source (11) out of the pick-off mirror (14) is incident on grating (18), see col. 6, lines 54-60. It would have been obvious to one of ordinary skill in the art at the time of invention that not only a portion of the source signal (11) is modulated as evidenced by the preceding passage, but also each modulator (27) in the array (26) receives a portion of the wavelength split beam. Furthermore, every wavelength emitted from the light source is predefined by definition of the inventor having knowledge of the desired light source.

Re claim 8, 26 Knox disclosed where the transmission medium is optical fiber; see col. 7, lines 40-45.

5. Claims 4, 5, 9, 11, 12, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox et al. US 5,526,155 A (Knox) in view of Roberts US 6,313,932 B1 and Wilner et al. US

6,341,021 B1 (Wilner).

Re claims, 4, 5 9, 20, 22 and 23, Knox does not disclose

Roberts disclosed frequency modulators as a filter for either passing, filtering portions of the optical signal having respective different wavelengths, see col. 3, lines 33-45. It would have been obvious to one of ordinary skill in the art at the time of invention to apply the frequency modulation and filtering system in Roberts to Know so as to modulate the entire spectrum with data and provide clear channel separation of signals.

Knox does not teach passbands.

Wilner teaches modulators (OF1, ..., fig. 1A) having a pass band for selecting the optical signal with a pas band, see col. 7 lines 20-37. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate filter having a passband for selecting a desired portion of a signal and creating greater and reduce power dissipation, see col. 2 lines 60-64.

6. Claims 16, 25, 30, 34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox et al. US 5,526,155 A (Knox) in view of Young et al. US 5760941 A (Young).

Re claim 16, 25, 30, 34, 36 Knox does not disclose using wherein carrier wavelengths are the same or shared. However, Young disclosed power dividers (104 of Figure 2) transmitting signals into modulators. It would have been obvious to one of ordinary skill in the art at the time of invention to use a more general beam splitter (divider) to duplicate the entire spectrum in each split signal as these type of splitters are extremely well known in the art for replicating signals.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Payne whose telephone number is (571) 272-3024. The examiner can normally be reached on M-F, 7a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dcp

David C. Payne
Patent Examiner
AU 2638